

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) Equipment for spectroscopic analysis of autofluorescence of a biological tissue comprising:
an excitation source (1),
a bundle (3) constituted by a single optical fibre or a plurality of flexible optical fibres, and
means for injecting (2) an excitation signal produced by said excitation source into said bundle according to a useful diameter corresponding to the excitation of the single fibre, all the optical fibres in the bundle or a specific sub-group, and
a means for analyzing (21, 22) an emitted autofluorescence signal,
~~characterized in that it comprises~~
an optical head (4) at said bundle (3) output,
[[an]] said optical head (4) intended to be placed in contact with the biological tissue (6),
said optical head being equipped with optical means adapted for converging the excitation signal coming out of said bundle (3) into a subsurface analysis zone (5), the same optical fibre or fibres of said bundle having served for carrying the excitation signal being used for detecting the signal emitted by

said subsurface analysis zone, and

means (D) placed upstream of the means for injecting (2)
~~being moreover~~ provided for separating the excitation signal
wavelength and the autofluorescence signal wavelength.

2. (currently amended) Equipment according to claim 1,
~~characterized in that~~ wherein the optical means of the optical
head (4) comprise a system of lenses forming a focussing
objective adapted for transcribing the spatial distribution of
the focal spot (PSF) at the fibre bundle output and the quality
of the wave front (WFE) and for minimizing the parasitic
reflection occurring at the fibre bundle output.

3. (currently amended) Equipment according to claim 1,
~~characterized in that~~ wherein the optical head (4) comprises a
glass plate intended to come into contact with the biological
tissue to be analyzed and adapted for producing an index
adaptation with said tissue.

4. (currently amended) Equipment according to claim 1,
~~characterized in that it comprises~~ further comprising:

a glass plate placed at the output of the optical fibre
bundle (3) and shared with the optical head (4),

said plate being sufficiently thick to reject the
parasitic parallel reflections at the output of said fibre bundle
(3).

5. (currently amended) Equipment according to claim 1, ~~characterized in that~~ wherein the means for injecting (2) into the optical fibre bundle (3) has a wave front quality and a spatial distribution of the focal spot intensity adapted to the useful diameter of the fibre bundle (3).

6. (currently amended) Equipment according to claim 1, ~~characterized in that~~ wherein the excitation source (1) emits at a wavelength adapted to excite chosen endogenous fluorophores present in the biological tissues of the observed site.

7. (currently amended) Equipment according to claim 1, ~~characterized in that~~ wherein for separating the wavelengths is a dichroic plate (D).

8. (currently amended) Equipment according to claim 1, ~~characterized in that~~ wherein the means for spectroscopic analysis comprise a spectrograph (20) and a means of coupling (21) to the slit of the spectrograph.

9. (currently amended) Equipment according to claim 8, ~~characterized in that~~ wherein the means for coupling (21) to the slit of the spectrograph comprises an achromatic optical means.

10. (currently amended) Equipment according to claim 8, ~~characterized by~~ further comprising:

a means for rejecting (22) placed upstream of the coupling means (21) and adapted for eliminating the backscattered excitation wavelength.

11. (currently amended) Equipment according to claim 10, ~~characterized by~~ further comprising:

a lens (L2) placed upstream of the means for rejecting (22) adapted for improving the signal-to-noise ratio.

12. (currently amended) Equipment according to claim 1, ~~characterized in that it comprises~~ further comprising:

a means for adapting (L1) the size of the beam emitted by the excitation source (1) to the useful diameter of the optical fibre bundle (3).

13. (currently amended) Equipment according to claim 1, wherein the fibre bundle (3) comprising a plurality of optical fibres, ~~characterized in that it moreover~~ further comprises means for jointly producing a confocal image of the analysis zone (5), comprising:

- an illumination source (30),
- a detector (35) of the return signal for analysis,
- a means for separating (31) the illumination signal and said return signal,

- means for coupling (D2) the excitation beam for the spectroscopic analysis and the illumination beam for the confocal imaging, before introduction into the means for injecting (2) into the optical fibre bundle (3),

- a means (32) for rapid scanning one by one of the fibres situated upstream of the means for injecting into the fibre bundle (3), and

- a system for spatial filtering (33) at the input to the signal detector (35) adapted for selecting the return signal originating from the fibre illuminated,

the means for injecting (2) into the fibre bundle (3) having a spatial distribution of the focal spot intensity equal to the diameter of a fibre core, each fibre being illuminated alternately and in an addressed manner.

14. (currently amended) Equipment according to claim 13, ~~characterized in that~~ wherein the means for coupling are placed upstream of the scanning means (32).

15. (currently amended) Equipment according to claim 13, ~~characterized in that~~ wherein the illumination source (30) is a pulsed laser diode.

16. (currently amended) Equipment according to claim 13, ~~characterized in that~~ wherein the illumination source has a wave front quality of the order of $\lambda/8$.

17. (currently amended) Equipment according to claim 13, ~~characterized in that~~ wherein the detector (35) of the return signal is an avalanche photodiode.

18. (currently amended) Equipment according to claim 13, ~~characterized in that~~ wherein the means for coupling (31) the excitation signal for the spectroscopic analysis and the illumination signal for the confocal imaging, comprise a dichroic plate (D2).

19. (currently amended) Equipment according to claim 13, ~~characterized in that~~ wherein the means (32) for rapid scanning of the fibres one by one comprises a mirror (M1) resonating at a given frequency and a galvanometric mirror (M2) with a variable frequency, and two optical systems each constituted by lenses (L5-8,L9-12) first adapted for conjugating the two mirrors (M1,M2) then the galvanometric mirror (M2) and the fibre bundle (3) input.

20. (currently amended) Equipment according to any claim 13, ~~characterized in that~~ wherein the spatial filtering system comprises a filtering hole (33) the size of which is such that it corresponds to the diameter of a fibre core, taking into account the magnification of the optical system, between the fibre bundle (3) input and the filtering hole (33).